METHODOLOGICAL RECOMMENDATIONS FOR STUDENT'S INDIVIDUAL WORK

Discipline: 'Basics of Physiology'

Discipline Code: MFN-1203-2

Speciality: 6B10101 'General Medicine'

Number of academic hours (credits): 90 hours (3 credits)

Year and semester: 1st year, 2nd semester

Individual Work: 60 hours

Shymkent, 2022

Head of the department: c.b.s., docent Zhakipbekova G.S.

Protocol of the meeting of the Department No. __10a___ dated '_06_' _05_ 2022

Methodical Recommendation No. 1

1. Theme: Functions of biological membranes. Ionic channels.

2. Learning goals: to study the main functions of biological membranes (permeability for ions, excitability, resting membrane potential and action potential)

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare questions on the topic of the lesson.
4. To briefly and easily present the material.
5. To be ready to answer questions.
6. To compile a glossary on the topic.

4. Way of Performing

1. Consultation on the topic.
2. Compilation of a presentation.

5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 1st-2nd week

7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. The structure of biological membranes;
2. Properties and functions of membranes;
3. The chemical composition of biological membranes;
4. Membrane proteins and their properties;
5. Artificial membranes.

Methodical Recommendation No. 2

1. Theme: Physiological bases of labour activity, features of physical and mental labour.

2. Learning goals: to get an idea of physiological bases of labour activity.

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.

4. Way of Performing

1. Compilation and defense of the presentation.

5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 18th week

7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. Classification of labour according to severity and loading.
2. Work performance.
3. Methods for assessing physical working capacity

Methodical Recommendation No. 3

1. Theme: Nociception and antinociceptive system of the body.

2. Learning goals: to study main characteristics of the nociception and antinociceptive system of the body.

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.

4. Way of Performing

1. Compilation and defense of the presentation.

5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 4th week

7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. List types of pain.
2. Specify biological significance of pain.
3. What is nociceptive reception?
4. Describe conduction of pain information.
5. What is the antinociceptive system of the body.

Methodical Recommendation No. 4

1. Theme: Neural pathways of the spinal cord.

2. Learning goals: to study structure and functions of the neural pathways of the spinal cord.

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.

4. Way of Performing

1. Compilation and defense of the presentation.

5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 5th week

7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. List the main neural pathways of the spinal cord.
2. Describe the acsending (sensory) pathways of the spinal cord.
3. Describe the descending (motor) pathways of the spinal cord.
4. How many neurons the acsending (sensory) pathways of the spinal cord consists of?
5. Describe function of the thalamus for transmission sensory information.
6. Characterize pyramidal and extra-pyramidal motor pathways.
7. How many neurons the descending (motor) pathways pathways of the spinal cord consists of?

Methodical Recommendation No. 5

1. Theme: Humoral regulation of functions. Age features.

2. Learning goals: to study the main principles of humoral regulation of the body.

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.

4. Way of Performing

1. Compilation and defense of the presentation.

5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 9th week

7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. What are the central and peripheral endocrine organs?
2. Characterize the hypothalamic-pituitary system.
3. List the main hormones of the pituitary, thyroid, parathyroid glands and the thymus.
4. Name functions of these hormones and the main mechanisms of how hormones work.
5. Characterize age features of humoral regulation.

Methodical Recommendations No. 6

1. Theme: Midterm examination No. 1.

2. Learning goals: to sum up the results of theoretical and practical materials.

3. Tasks

1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.

4. Way of Performing

1. Preparation of midterm control
2. Preparation of MCQ tasks and oral questions.

5. Criteria of performance and assessment: see appendix No. 1

4. Questions relating to the theme:

1. The main physiological states of the biological membrane;
2. The role of the concentration of sodium, potassium, and chlorine for biopotentials being evoked;
3. Methods of investigation of excitable tissues;
4. Resting membrane potential;
5. Action potentials;
6. Excitability change in different phases of the excitation process.
7. Types of muscle tissues.
8. Functions and properties of skeletal muscles.
9. Types of muscle contraction.
10. Single contraction.
11. Summarized contractions (*unfused and fused tetanus*).
12. The mechanism of muscle contraction.
13. Modes of muscle contraction.
14. Reaction of muscles to passive stretching.

15. Work and strength of muscles.
16. Fatigue of muscles.
17. Features of the contraction of smooth muscles.
18. Structure and classification of nerons.
19. Structure and properties of unmyelinated nerve fibers.
20. Structure and properties of myelinated nerve fibers.
21. A mechanism of propagation of the excitation through nerve fibers.
22. Nerve fibers (afferent and efferent).
23. Nerves (sensitive, motor, and vegetative).
24. Features of propagating the excitations through mixed nerve.
25. Parabiosis. Phases of parabiosis.
26. Notions "synapse" and "synaptic transmission of excitation".
27. Anatomic, neurochemical, and functional classifications of synapses.
28. Morfologic classificaction of nerve endings.
29. Types, structure, and properties of receptors.
30. Types, structure, and properties of effectors.
31. Ultrastructure of a synapse.
32. Physiologic properties of a synapse.
33. Stages and mechanism of a synaptic transmission.
34. Notion about ambivalence of neurotransmitters and causes of ambivalence.
35. Pathways of synthesis and inactivation of acetylcholine and norepinephrine.
36. Mechanism of excitation transmission in excitatory and inhibitory synapses.
37. Notion on central and peripheral nervous system.
38. General characteristic of CNS.
39. Notion on a reflex.
40. Classification of the reflexes.
41. Reflex time.
42. Structure of the reflex arc.
43. Simple and complex reflex arcs.
44. Notion on receptive field of a reflex.
45. Blood-Brain Barier.
46. The process of excitation on the CNS.
47. Notion of "nerve center".
48. Properties of the nerve centers:
    a) summation of the excitation;
    b) transformation of the excitation rate;
    c) irradiation;
    d) convergence;
    e) reverberation.
49. Process of inhibition in the CNS.
50. Central (Sechenov's) inhibition.
51. Types of inhibition in the CNS:
    a) presynaptic;
    b) postsynaptic;
    c) recurrent (antidromic);
    d) inhibition after excitation;
    e) pessimal.

52. Principles of a coordinative activity of the CNS.
53. Physiology of autonomic nervous system.
54. Scheme of a vegetative reflex arc.
55. Notion on central and peripheral parts of sympathetic division of the VNS.
56. Notion on central and peripheral parts of parasympathetic division of the VNS.
57. Notion on metasypathetic division of the VNS.
58. Integrity of vegetative and somatic nervous system.
59. Meaning of the VNS.
60. Dependence between an effect of irritation of vegetative nerves and state of a innervated organ (effector).
61. Notion of "nerve center".
62. Properties of the nerve centers.
63. Process of inhibition in the CNS.
64. Central (Sechenov's) inhibition.
65. Types of inhibition in the CNS.
66. Principles of a coordinative activity of the CNS.
67. Physiology of autonomic nervous system.
68. Scheme of a vegetative reflex arc.
69. Notion on central and peripheral parts of sympathetic division of the VNS.
70. Notion on central and peripheral parts of parasympathetic division of the VNS.
71. Notion on metasypathetic division of the VNS.
72. Integrity of vegetative and somatic nervous system.
73. Meaning of the VNS.

5. Methods of learning and teaching – performance of MCQ tasks, written or oral answer to questions.

6. Terms of performance: on the 7th week

7. Bibliography: see apendix No. 1.

8. Assessment procedures

Tests

1. Excitable tissues are ....
a) nervous, muscular, glandular
c) nervous, cartilaginous, connective
c) muscular, epithelial, glial
d) glandular, bone, collagen fibers
e) tendons, muscular, bone
2. Accommodation of tissue occurs ....
a) with a slow increase of the stimulus strength
b) with a rapid increase of the stimulus strength and a prolonged action
c) with the rhythmic action of the stimulus of the superthreshold force
d) with the rectangular action of electricity, with a sinusoidal electricity
e) under the exposure of a strong electrical stimulus of rectangular shape
3. Membrane potential is formed due to ....
a) unequal permeability of the membrane for Na + and K +
c) lack of membrane permeability
c) permeability for ions CI- and Mg2 +
d) the permeability of the Ca2 + and Na +
e) membrane permeability for CI and Ca2 +

4. Membrane potential ..., if you increase the concentration of sodium in the cell
a) decrease down to disappearing
c) does not change
c) will increase to a critical value
d) phase changing, then decrease
e) quickly fluctuates
5. Membrane potential ..., if you increase the concentration of potassium in the cell.
a) increases to a critical value
c) does not change
c) decreases down to disappearing
d) phase changing and decrease
e) quickly fluctuates
6. Depolarization of the membrane occurs under the influence of ....
a) acetylcholine, epinephrine
b) gammaaminobutyric acid, glycine
c) light, adrenaline
d) atropine, acetylcholine
e) cholinesterase, serotonin
7. The action potential arises ....
a) under the irritator of a threshold stimulus with a single stimulus
b) under the irritator of a subliminal stimulus
c) under the irritator of a superthreshold and threshold inpulsed electricity
d) under the irritator of a superthreshold stimulus of any physical and chemical nature
e) under the irritator of electromagnetic waves of any intensity
8. Passive transport of substances through the membrane is the transport ....
a) by the concentration and electrochemical gradient
b) involving membrane channels and ATP
c) the energy provided by ion pumps and donors
d) with the participation of ATP and ion pumps
e) involving membrane channels and ion pumps
9. During a local response ....
a) the excitability of the tissue is increased and the ability to summation of excitations is recorded
b) the excitability of the tissue decreases, refractory period is recorded
c) the excitability of the tissue disappears, the absolute refractory phase develops
d) the excitability of the tissue does not change under the impact of threshold and superthreshold stimuli
e) the excitability of the tissue is increased only by superthreshold and subthreshold stimuli
10. Biopotentials of excitable tissues are recorded with....
a) a galvanometer, an oscilloscope
b) rheograph, sphygmograph
c) pneumograph, myograph
d) pulse tachometer, impulse generator
e) a blood pressure monitor, a manometer
11. Chronaxie is the shortest time during which the electricity ....
a) with voltage of two rheobasis causes excitation
b) with voltage of one rheobasis causes excitation
c) with the threshold strength causes excitation

d) with subthreshold strength causes a decrease in membrane potential
e) with voltage of three rheobasis causes excitation
12. Accommodation is a property of excitable tissue ....
a) to increase the threshold of excitability with a slow increase in the strength of stimulation
b) to lower the threshold of excitability with a slow increase in the strength of stimulation
c) to increase the speed of propagating the excitation in response to the threshold stimulus
d) to lower the threshold of excitability in response to a superthreshold stimulus
e) to increase the threshold of excitability in response to instant irritation
13. During repolarization phase...
a) inactivation of sodium permeability
b) activation of potassium permeability
c) inactivation of potassium permeability
d) an increase the sodium within the cell
e) an increase the chlorine within the cell
14. Under the active transport of substances through the membrane is understood transport ....
a) involving membrane ion pumps and ATP
b) involving an energy donor
c) by the concentration gradient
d) on the electric gradient
e) with the participation of oxygen
15. The membrane potential is the difference of charges between ....
a) the positive outer surface of the cell membrane and the negative inner one
b) the positive inner surface of the cell membrane and the negative outer one
c) the negative inner surface of the cell membrane and indifferent the outer one
d) the negative outer surface of the cell membrane and the indifferent the inner one
e) the positive outer surface of the cell membrane and the indifferent inner one
16. The depolarization phase corresponds to excitability ....
a) absolute refractoriness
b) primary relative refractoriness
c) secondary relative refractoriness
d) a slight increase
e) exaltation
17. The phase of repolarization corresponds to excitability ....
a) absolute refractoriness
b) primary relative refractoriness
c) secondary relative refractoriness
d) a slight increase
e) exaltation
18. The phase of hyperpolarization corresponds to excitability ....
a) relative refractoriness
b) primary absolute refractoriness
c) secondary relative refractoriness
d) a slight increase
e) exaltation
19. The action potential corresponds to ....
a) increase of permeability for Na + and membrane depolarization
b) repolarization and hyperpolarization of the membrane

c) local change in permeability, local response
d) residual depolarization and negative trace potential
e) local change in membrane permeability and hyperpolarization
20. The local answer is understood ....
a) local non-spreading excitation under the influence of a subliminal stimulus
b) change in permeability under the influence of superthreshold and threshold stimuli
c) change in permeability under the influence of a single and pulsed stimulus
d) change in permeability under the influence of tissue irritation, current under the anode
e) change in permeability of the membrane when stimulated by direct current under the cathode
21. Skeletal muscles are capable of ....contraction.
a) tetanic
b) tonic
c) single
d) phasic
e) the spastic
22. Smooth muscles are capable of.... contraction.
a) tonic
b) tetanic
c) single
d) phasic
e) the spastic
23. Physiological properties of smooth muscles:
a) excitability, conductivity, contractility, automatism
b) high speed of reduction, fatigue, automatic
c) conductivity, high speed of propagating the excitation and high frequency of contruction
d) inability to single cuts
e) plasticity, automatism and not subordination to the effects of the central nervous system
24. Adequate irritants of the nervous tissue are ...
a) electrical, neurotransmitters
b) electrical, osmotic
c) thermal, chemical
d) osmotic, electrical
e) magnetic
25. Lability of the nerve, muscle, synapse of warm-blooded animals (accordingly for nerve, muscle, and synapse)…
a) 1000, 300, and 100 imp / sec
b) 500, 300, and 50 imp / sec
c) 600, 200, and 1000 imp / sec
d) 400, 100, and 70 imp / sec
e) 1000, 100, and 200 imp / sec
26. Lability is higher, and refractoriness is less for ....
a) nerve fibers
c) the nerve center
c) synapse
d) skeletal muscle
e) smooth muscle
27. In unmyelinated nerve fibers, excitation is spread by ....

a) the fiber membrane
b) axoplasma
c) myelin sheath
d) the soma of a neuron
e) nodes of Ranvier

28. In myelinated nerve fibers, excitation is spread by....
a) nodes of Ranvier
b) axoplasma
c) myelin sheath
d) the soma of a neuron
e) the fiber membrane

29. Phases of parabiosis happen through the following sequence:
a) equalizing, paradoxical, inhibitory.
b) inhibitory, equalizing, paradoxical
c) paradoxical, equalizing, inhibitory.
d) equalizing, inhibitory, paradoxical.
e) inhibitory, paradoxical, equalizing.

30. The transmission of excitation in the chemical synapse occurs with the help of ....
a) the mediator
b) electricity current
c) enzyme
d) hormone
e) magnetic wave

31. Lability of the nerve, muscle, synapse of warm-blooded animals ....
(nerve, muscle, and synapse accordingly)
a) 1000 300 100 imp / sec
b) 500 300 50 imp / sec
c) 600 200 1000 imp / sec
d) 400 100 70 imp / sec
e) 1000 100 200 imp / sec

32. Lability is higher, and refractoriness (refractory period) is less for ....
a) nerve fibers
c) mixed nerve
c) synapse
d) skeletal muscle
e) smooth muscle

33. In the chemical synapse, excitation is spread from ....
a) the presynaptic membrane to the postsynaptic membrane
b) axoplasm of the neuron to the postsynaptic membrane of the effector
c) myelin sheath to Ranvier interceptions
d) the soma of the neuron to the presynaptic membrane
e) the postsynaptic membrane to the presynaptic membrane

34. In the neuromuscular synapse, excitation is spread ....
a) by one direction
b) bilaterally
c) no synaptic delay
d) without fatigue

e) using various mediators
35. Stages of synaptic transmission proceed in the following sequence:
a) neurotransmitter synthesis, neurotransmitter secretion, neurotransmitter interaction with chemoreceptors, inactivation of the neurotransmitter.
b) neurotransmitter secretion, neurotransmitter synthesis, neurotransmitter interaction with chemoreceptors, inactivation of the neurotransmitter.
c) interaction of the neurotransmitter with chemoreceptors, neurotransmitter synthesis, neurotransmitter secretion, inactivation of the neurotransmitter.
d) activation of the neurotransmitter, neurotransmitter synthesis, neurotransmitter secretion, neurotransmitter interaction with chemoreceptors.
e) neurotransmitter synthesis, neurotransmitter activation, neurotransmitter secretion, neurotransmitter interaction with chemoreceptors.
36. The inhibitor of acetylcholine is ....
a) catecholoxymethyltransferase (COMT)
b) monoamine oxidase (MAO)
c) cholinesterase
d) atropine
e) muscarine
37. The inhibitor of norepinephrine and adrenaline are ....
a) catecholoxymethyltransferase (COMT), monoamine oxidase (MAO)
b) monoamine oxidase (MAO), nicotine
c) catecholoxymethyltransferase (COMT), cholinesterase
d) atropine, nicotine
e) muscarine, cholinesterase
38. In the electric synapse, excitation is spread ....
a) in one way direction
b) bilaterally
c) with synaptic delay
d) with chemical specificity
e) using a neurotransmitter
39. Ultrastructure of the synapse ....
a) presynaptic membrane, postsynaptic membrane, synaptic cleft
b) presynaptic membrane, synaptic cleft, postsynaptic membrane
c) postsynaptic membrane, presynaptic membrane, synaptic cleft
d) synaptic cleft, presynaptic membrane, postsynaptic membrane
e) postsynaptic membrane, synaptic cleft, presynaptic membrane
40. The morphological basis of the reflex is ....
a) a reflex arc
b) nerve fibers
c) nerve trunks
d) neurons
e) neuroglia
41. The time of the reflex reaction when the irritant strength decreases ...
a) increase
c) does not change
c) decrease
d) is stabilized

e) does not change
42. The reflex arc includes ....
a) receptor, sensitive neuron, center, motoneuron, organ
c) centripetal neuron, center, effector organ
c) sensitive neuron, receptor, center, synapses
d) the nerve center, motoneurons, synapses
e) receptor, centrifugal neuron, synapses, effector organ
43. CNS has ....influence on the organism tissues.
a) functional, trophic, vasomotor
c) functional, inhibitory, subordinate
c) trophic, regulatory, summary
d) vasomotor, functional, humoral
e) nervous, humoral, trophic
44. The Bell-Magendie law states that the spine roots ....
a) posterior roots are sensitive, anterior roots are motor
b) posterior and anterior roots are sensitive
c) posterior roots are sensitive, lateral ones are motor
d) posterior and anterior roots are motor
e) posterior roots are motor, anterior roots are sensitive
45. Motor disorders during the cerebellum is damaged with time disappear due to ....
under the action of a threshold single stimulus
a) the plasticity of the nerve centers of the cortex
b) the enhanced function of the vestibular analyzer
c) inhibition of the red nucleus
d) excitation of a black substance
e) the connections of the pale sphere to the striated body
46. When making thin movements, the muscle tone is regulated by.
a) black substance
b) medulla oblongata
c) the varioli bridge
d) red nucleus
e) quadruple on concentration and electrochemical gradient
47. Neurons providing the patellar reflex are localized in ....
a) II-IV lumbar segments
b) sacral region of the spinal cord
c) thoracic part of the spinal cord
d) X-XII thoracic segments
e) cervical part of the spinal cord
48. The motor pathways of the spinal cord are:
a) spino-cortical, thalamic, cerebellar, and proprioceptive
b) vestibulo-, tectospinal, spinocortical, thalamic
c) cortico-, rubro-, vestibulospinal, spinalomatic
d) cortico-, rubro-, vestibulo-, reticulospinal
e) cerebellar, spinotalamic, reticulospinal, cortical
49. Inhibition of the motor neurons of muscles - antagonists is called ....
a) reciprocal
c) presynaptic

c) postsynaptic
d) antidromic
e) pessimal
50. The inhibitory neurotransmitter are ....
a) GABA, glycine
b) endorphins, GABA
c) enkephalins, substance P
d) acetylcholine, epinephrine
e) acetylcholine, GABA
51. The inhibition in the central nervous system was first discovered by....
a) Sechenov I.M.
c) Pavlov I.P.
c) Anokhin P.K
d) Descartes P
e) Sherrington Ch
52. The main nerve processes that characterize the function of the central nervous system ....
a) excitatory, inhibitory
b) functional rest, lability
c) excitatory, refractory
d) inhibitory, equalizing
e) equalizing, paradoxical
53. The reflex principle on the function of higher departments of the central nervous system was spread by....
a) Sechenov
c) Sherrington
c) Holtz
d) Pavlov
f) Anokhin
54. One of the main properties of nerve centers is the dominance, which was discovered by....
a) Ukhtomsky A.A.
b) Vvedensky N.E.
c) Bykov K.M.
d) V.V. Parin
e) Anokhin P.K
55. The tonus of the nerve centers .... when cutting the centripetal tract.
a) disappear
b) increase
c) decrease
d) does not change
e) phase change
56. Sechenov's inhibition is characterized by ....
a) lengthening of the acid reflex time, excitation of Renshaw cells
b) hyperpolarization of the postsynaptic membrane of motoneurons, excitation of Renshaw cells
c) excitation of Renshaw cells, membrane depolarization
d) shortening of the acid reflex time, excitation of Renshaw cells
e) inhibition of Renshaw cells, hyperpolarization of the postsynaptic membrane

57. The principle of coordination of reflexes, according to which the impulse from the working organ enters the center after the reflex act, is called ....
a) reverse afferentation
b) the transformation of the rhythm
c) divergence
d) irradiation of excitation
e) aftereffect
58. Excitation in the central nervous system
a) spreads one-sidedly, summarizes, irradiates
b) summarized, transformed, distributed bilaterally
c) converts, lags, accommodates
d) irradiates, decelerates, is blocked
e) distributed bilaterally, delayed in synapses
59. Post-tetanic potentiation is characterized by
a) increased reflex response, increased neurotransmitter release in synapses
b) increased reflex response, decreased neurotransmitter release in synapses
c) weakening the reflex response, increasing the release of the neurotransmitter at the synapses of the subthreshold force causes a decrease in the membrane potential
d) occurrence of inhibitory post-tetanic potential and accumulation of calcium ions
e) weakening the reflex reaction, reducing the neurotransmitter release by presynaptic endings
60. The phenomenon of the dominance is ....
a) the predominant focus of excitation in the central nervous system
b) summation of excitations
c) a change in the excitation rhythm
d) circulation of excitation along a closed circle of neurons
e) plasticity of the nerve center
61. The spread of excitation and inhibition in the cerebral cortex is called ....
a) irradiation
b) concentration
c) by induction
d) Occlusion
e) Convergence
62. Self-regulation of body functions is based on the principle of ....
a) reverse afferentation
b) of a locational afferentation
c) afferent synthesis
d) dominant motivation
e) reciprocal innervation
63. The activity of the cerebral cortex is controlled by the laws ....
a) concentration, irradiation, mutual induction
b) concentration, adaptation, induction
c) irradiation, dominance, lability
d) mutual induction, protraction, summation
e) irradiation, reverberation, convergence
64. The sympathetic nervous system causes ....
a) increase in heart rate and strength of beats
b) increase secretory and motor function of the stomach

c) reduction in heart rate and strength of beats
d) widening of the tongue vessels, and salivary glands
e) pupil narrowing
65. The centers of the sympathetic nervous system are located in ....
a) thoraco-lumbar segments of the spinal cord
b) medulla oblongata
c) caudal segments of the spinal cord
d) the pons and the cerebellum
e) mesencephlon
66. With an increase in influence of the parasympathetic division of the nervous system, the size of the pupil ....
a) decreases
b) increases
c) increases, then decreases
d) does not change
e) decreases, then increases
67. With an increase in influence of the sympathetic nervous system, the size of the pupil
a) increases
b) decreases
c) narrows, then widens
d) does not change
e) expands, then narrows
68. Narrowing of the vessels are caused by an irritation.... of the nerve fibers.
a) sympathetic and adrenergic
b) sympathetic and cholinergic
c) parasympathetic and cholinergic
d) parasympathetic and serotonergic
e) somatic and cholinergic
69. When the peripheral end of the vagus nerve is irritated
a) cardiac activity slows, blood pressure increases
b) cardiac activity increases, blood pressure decreases
c) cardiac activity slows, blood pressure decreases
d) cardiac activity increases, blood pressure increases
e) cardiac function and blood pressure do not change
70. Local widening of the skin vessels in response to mustard plasters is provided by
a) Bainbridge reflex
b) axon reflex
c) aortic reflex
d) the Zion-Ludwig reflex
e) Parin reflex
71. With irritation of parasympathetic nerve fibers secretion of saliva…
a) increases
b) decreases
c) does not change
d) increases, then decreases
e) decreases, then increases
72. Widening of internal organs vessels...

a) is active with an increase in influence of sympathetic nerves
b) is active when influence of parasympathetic nerves is increased
c) passively with a decrease of the influence of the sympathetic nerves
d) passively with a decrease in the influence of parasympathetic nerves
e) is active in increasing the influence of somatic nerves
73. Reflex self-regulation of respiration (Gering-Breyer reflex) impulses coming from ....
a) mechanoreceptors of alveoli, proprioceptors
b) Vessel mechanoreceptors and proprioceptors
c) receptors of nasal mucosa and skeletal muscular proprioceptors
d) chemoreceptors of the medulla oblongata and interoceptors of internal organs
f) proprioceptors of skeletal musculature and vestibular receptors

Methodical Recommendation No. 7
1. Theme: Features of synaptic transmission.
2. Learning goals: to study physiological properties of a synapse.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 8th week
7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions
1. What is the structure of a synapse?
2. What is the neurotransmitter?
3. List the main stages of the synaptic transmission.
4. Specify mechanism of synaptic transmission in an excitatory synapse.
5. Specify mechanism of synaptic transmission in an inhibitoty synapse.

Methodical Recommendation No. 8
1. Theme: Microcirculation
2. Learning goals: to study the mechanism of microcirculation and factors ensuring exchange of gases and nutrients.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1

6. Terms of performance: on the 9th week
7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions
1. List the features of the main vessels of microcirculatory bed (arterioles, meta-arterioles, capillaries, postcapillaries, venules, arteriole-venous anastomoses).
2. Describe the blood flow in the microvascular bed (velocity, pressure).
3. List the main factors contributing to exchange of gases and nutrients between the blood and the surrounding tissue.

Methodical Recommendation No. 9
1. Theme: Immunity. Types of immunity.
2. Learning goals: to study the main types of immunity.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 10th week
7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions
1. What is immunity?
2. Define notions of 'antigens', 'antibodies' and 'immunological control'.
3. What is nonspecific immunity?
4. Characterize specific (acquired) immunity.
5. Describe the role of the lymphocytes in humoral immunity.
6. List the phases of the immune response.
7. Describe the main role of the thymus, spleen and lymph nodes for immunity.

Methodical Recommendation No. 10
1. Theme: Vitamins.
2. Learning goals: to study role of vitamins for the activity of the organism
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 11th week

7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions
1. Name the main types of vitamins.
2. List main water-soluble vitamins.
3. List main fat-soluble vitamins.
4. Describe the role of vitamins for life of an organism.
5.Allowance for vitamins per a day.
6. Which conditions may be developed under the insufficient amount of vitamins consumed?
7. What is avitaminosis and hypovitaminosis? Give examples.
8. What is hypervitaminosis?

Methodical Recommendation No. 11
1. Theme: The role of water and salts in the body.
2. Learning goals: to study the role of water and salts in the body.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 12th week
7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions
1. Characterize the basic principles of the exchange of mineral salts and water.
2. Describe the compound and role of the intracellular fluid.
3. Describe the compound and role of the tissue or interstitial fluid.
4. Define the normal values of sodium, potassium and calcium in the blood.

Methodical Recommendation No. 12
1. Theme: Sensory, membrane and nuclear reception. The mechanism of ligand-receptor interaction.
2. Learning goals: to study the structural and functional features of the reception.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare an esssay on the topic of the lesson.
4. To briefly and easily present the material of the essay.
5. To be ready to answer questions on the essay.
4. Way of Performing
1. Writing of an essay.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 13th week
7. Bibliography: see appendix No. 2

8. Assessment procedures

Questions

1. Name main general principles of sensory, membrane and nuclear reception.
2. Specify the mechanism of ligand-receptor interaction.
3. List the main features of ligand-receptor interaction

Methodical Recommendations No. 13

1. Theme: Midterm examination No. 2

2. Learning goals: to sum up the results of theoretical and practical materials.

3. Objectives: to check the level of knowledge of theoretical material and the development of practical skills on topics covered.

4. Questions relating to the theme:

1. General characteristics of humoral (endocrine and non-endocrine) regulatory factors;
2. Endocrine functions of non-endocrine organs (kidneys, heart, lungs, muscles, and skin);
3. Structural and functional organization of the endocrine system;
4. Classification of hormones;
5. Mechanisms of the hormonal action;
6. Trans- and para-pitiutary regulation of the endocrine glands;
7. Relations between the endocrine glands and the nervous system;
8. Studying methods for the endocrine glands;
9. Local and systemic hormonal self-regulation;
10. Hypothalamic-pituitary system. Neurosecretes of the hypothalamus: liberins and statins.
11. General characteristics of body fluids. Intracellular and extracellular fluids.
12. Functional systems that provide the constancy of osmotic pressure and the acid-base homeostasis of blood.
13. The main functions of blood.
14. Depot of blood, and their significance.
15. Composition and functions of plasma.
16. Proteins of blood plasma, their significance.
17. Blood elements: red blood cells, leukocytes, platelets.
18. Life cycle of erythrocyte (erythropoiesis).
19. Types of hemolysis.
20. Erythrocyte sedimentation rate.
21. Systemic and Pulmanary blood circulations.
22. The main arteries and veins of a human.
23. Morphologic and functional classification of blood vessels.
24. What is hemodynamics?
25. List the main laws of hemodynamics.
26. What is the role of arterioles in the body?
27. How the minute volume of blood is measured?
28. What is the linear velocity of blood flow?
29. What is the volumetric growth of blood flow?
30. What is the speed of blood flow in the different vessels.
31. Explain the mechanisms of blood flow through the arteries and veins.
32. List the factors that influence on the blood pressure.
33. Arterial pulse, its parameters.

34. What are arteriovenous anastomosis?
35. How is capillary metabolism carried out?
36. Metabolism of the body.
37. The plastic and energy role of proteins.
38. The plastic and energy role of carbohydrates.
39. The plastic and energy role of lipids.
40. Assimilation and dissimilation of substances.
41. Nitrogen balance.
42. Methods for determining the energy consumption.
43. Respiratory coefficient and its value for the calculation of energy consumption.
44.What is the basal methabolism? What factors impact on the amount of basal metabolism? What methods do you know about it?
45. How does the energy methabolism change during physical labor and mental work?
46. What are the specific and dynamic actions of food?
47. What enzymes break down the main nutrients?
48. Describe the physiological basis of rational nutrition.
49. Balanced nutrition (adequate nutrition, rational nutrition).
50. Role of microelements and vitamins in nutrition.
51. Constant temperature of the internal environment of the body.
52. Daily fluctuations in human temperature.
53. Thermoregulation, its notion, and types.
54. Heat production: metabolism as a source of heat generation.
55. The role of organs and tissues in heat production.
56. Heat loss: types and regulation.
57. Thermoreception. Peripheral and deep, cold and warm thermoreceptors.
58. Thermoregulation at a high and a low temperatures of environment.
59. The I.P. Pavlov's doctrine about the analyzers
60. Notion of sensory systems
61. Classification of analyzers
62. General principles of the structure and function of analyzers
63. What is the structure and function of the outer layer of the eye?
64. What is the structure and functions of the middle layer of the eye?
65. Pupil and regulation of its sizes. M-cholino- and a-adrenergic receptors of muscles, which narrow and dilate the pupil. Pupillary reflex.
66. What are the adaptations of the eye?
67. Characteristics of the light refracting matters of the eye.
68. What is the refraction of the eye and what are its anomalies?
69. What is a visual acuity?
70.What is the field of view?
71. The accommodation of the eye and its mechanism.
72. Classification of skin receptors
73. Physiologic properties of receptors
74. Conductive pathways of the skin analyzer (tactile, painful, temperature) of the analyzer.
75. Cortical representations of the skin analyzer.
76. Nociception.
77. Physiological role of the auditory analyzer;
78. Structural and functional organization of the auditory analyzer;

79. Features of the structure and physiological meaning of the external ear;
80. General outline of the structure and physiological meaning of the middle ear.
81. General outline of the structure and physiological meaning of the inner ear.
82. Theory of the sound perception.
83. Receptory, conductive, and central sections of the auditory analyzer.
84. The meaning of the muscular apparatus of the tympanum.
85. The mechanism of sound transmission in the cochlea.
86. Electrical phenomena in the cochlea.
87. Bone and aerial conduction.
88. Methods of an investigating the audition.
89. Structure of the vestibular analyzer: receptory, conductive, and central parts.
90. Structure and functions of the equilibrium organ.
91. Sensitivity of the otoconic apparatus (otoconium), irritant types for the equilibrium receptors.
92. Methods for studying the vestibular analyzer.
93. Structure of the taste analyzer: receptoy, conductive, and central parts.
94. Functional elements of the taste analyzer (taste buds): morphofunctional classification.
95. The mechanism of the reception for sour, sweet, salty, and bitter tastes.
96. Conducting pathways of the taste analyzer.
97. Central parts of the taste analyzer.
98. Structure of the olfactory analyzer: peripheral, conductive, and central parts.
99. Features of olfactory reception in humans.
100. Interaction between the olfactory and the taste analyzers.
101. Sensitivity of the otoconic apparatus (otoconium), irritant types for the equilibrium receptors.
102. Methods for studying the vestibular analyzer.
103. Structure of the taste analyzer: receptoy, conductive, and central parts.
104. Functional elements of the taste analyzer (taste buds): morphofunctional classification.

5. Methods of learning and teaching see apendix No. 1.

6. Terms of performance: on the 14th week

7. Bibliography: see apendix No. 2.

8. Assessment procedures

MCQ Tasks

1. The parathyroid hormone is ...
a) parathyroid hormone.
b) thyrocalcitonin.
c) insulin.
d) glucagon.
e) aldosterone.
2. The secretion of parathyroid hormone causes ... in the blood.
a) increase of calcium
b) decrease of calcium
c) increase of amino acids
d) decrease of amino acids
e) increase of phosphorus
3. Hormones that control the menstrual cycle ...
a) FSH, estrogens, LSG, progesterone.

b) melanotropin, androgens, LSG, progesterone.
c) STH, FSH, progesterone, estrogens.
d) FSH, glucagon, STH, parathyroid hormone.
e) FSH, insulin, progesterone.
4. Insulin ...
a) causes hypoglycemia, increases the absorption of glucose by cells, causes the synthesis of glycogen in the liver, muscles from glucose.
b) increases the permeability of cell membranes to glucose, causes hyperglycemia and glycogenolysis in liver cells, inhibits glycogenogenesis.
c) reduces permeability for amino acids and glucose, inhibits the conversion of glucose into glycogen, causes hyperglycemia.
d) stimulates glycoeogenesis, enhances the oxidation of glucose, reduces the formation of ketone bodies.
e) reduces protein catabolism, causes hyperglycemia, increases permeability of cells for glucose and amino acids.
5. Hormones of the gastrointestinal tract ...
a) bombesin, secretin, and motilin.
b) gastrin, secretin, ACTH, FSH.
c) Willikinin, bombesin, thyroxine, melatonin.
d) ACTH, bombesin, FSH, secretin.
e) motilin, adrenaline, thyroxine, gastrin.
6. Female gender hormones ...
a) estrone, estriol, estradiol.
b) parathyroid hormone, serotonin, thyrocalcitonin.
c) serotonin, estriol, bradykinin.
d) thyroxine, estrone, testosterone.
e) testosterone, thyroxine, serotonin.
7. After removing the adrenal cortex, death occurs because of ...
a) violation of water-salt metabolism.
b) disorders in protein metabolism.
c) disorders of fat metabolism.
d) disorders of carbohydrate metabolism.
e) metabolic disorders of vitamins.
8. The fat content in the depot ... under the influence of the thyroxine hormone.
a) decreases
b) does not change
c) increases
d) increases, then decreases
e) decreases, then increases
9. Myxedema develops with hypofunction ...
a) of the thyroid gland.
b) the adrenal glands.
c) the pancreas.
d) gonads.
e) neurohypophysis.
10. The hormones of the adrenal medulla include:
a) Glucocorticoids.

b) Pitiutary hormones.
c) Mineralocorticoids.
d) Adrenaline and noradrenaline.
e) Releasing factors.
11. The blood plasma contains the folowing types of proteins ...
a) albumins, globulins, fibrinogen.
b) globulins, myoglobin, fibrin.
c) fibrinogen, carbhemoglobin, albumin.
d) myoglobin, oxyhemoglobin, globulins.
e) albumins, methemoglobin, fibrinogen.
12. Oxyhemoglobin is a hemoglobin which contains...
a) oxygen.
b) Carbon dioxide.
c) Carbon monoxide.
d) glucose.
e) water.
13. Biological hemolysis occurs when ...
a) infusion of incompatible blood.
b) the action of acids, alkalis, ether.
c) the effect of heat.
d) decrease in the osmotic pressure of the plasma.
e) the effect of electricity.
14. Substances that prevent blood clotting ...
a) heparin.
b) epinephrine.
c) adrenaline.
d) Calcium.
e) Pepsin.
15. The blood system includes ...
a) hemopoiesis and blood destruction, circulating blood,
apparatus for the regulation of their functions.
b) circulating blood, heart, vessels, apparatus for their regulation
functions.
c) organs of hematopoiesis and blood loss, blood vessels,
blood.
d) circulating blood, organs of hematopoiesis and blood distribution.
e) circulating blood, blood depot, bone marrow, vessels.
16. The color index of the blood characterizes ...
a) degree of saturation of erythrocytes with hemoglobin.
b) the degree of saturation of erythrocytes with iron.
c) hemoglobin that is contained in blood.
d) the ratio of the erythrocytes to the leukocytes.
e) the ratio of the plasma to the blood cells.
17. Erythropoietins are formed in ...
a) kidney, liver, spleen.
b) heart, spleen, adrenal glands.
c) the spleen, pituitary, muscles.

d) lungs, stomach, intestines.
e) intestines, hypothalamus, bone marrow.
18. The volume of circulating blood in adults ...
a) 6.5-7% of body weight - 4-5 liters.
b) 3-5% of body weight - 1.5-2 liters.
c) 9-10% of body weight - 7-8 liters.
d) 11-12% of body weight - 8-9 liters.
e) 13-15% of body weight - 10-12 liters.
19. Platelets ...
a) secrete retractoenzyme, serotonin, promote the formation of thromboplastin.
b) have blood group determinants, release antibodies, transfer O2.
c) secrete serotonin, participate in allergic reactions, transfer water.
d) promote the formation of thromboplastin, are antagonists of mast cells.
e) secrete serotonin, heparin, prevent blood clotting.
20. Carboxyhemoglobin is a hemoglobin that contains...
a) Carbon monoxide.
b) Carbon dioxide.
c) Oxygen.
d) glucose.
e) water.
21. The percentage distribution of the specific forms of leucocytes is called:
a) color index
b) a hematocrit
c) leukocyte formula
d) nuclear index
e) osmotic resistance
22. The substance possessing the most strong influence on the colloid and osmotic pressure
a) fibrinogen
b) globulins
c) albumins
d) sodium
e) Potassium
23. How does blood pressure change if renin secretion would be risen...
a) will increase
b) will not change
c) decrease
d) will fall sharply
e) will change phase
24. A sharp drop in blood pressure is observed in ...
a) arterioles.
b) arteries.
c) veins.
d) capillaries.
e) Venules.
25. Phlebogram is a method of graphical registration ...
a) pulse oscillations of veins.
b) pulse fluctuations of the arteries.

c) biopotentials of the heart.
d) respiratory movements of the chest.
e) the blood pressure curve.
26. To determine blood pressure, the method of ... is used
a) Korotkoff-Riva-Rocchi.
b) rheocardiography.
c) capillaroscopy.
d) plethysmography.
e) phonocardiography
27. Systolic pressure is ...
a) the maximum pressure during ventricular systole in the arteries.
b) the pressure difference between the aorta and the veins.
c) minimum pressure in the vessels during diastole.
d) pressure difference in the aorta and capillaries.
e) the pressure at the time of the collapse of the semilunar valves.
28. Blood pressure decreases as the blood moves along the vessels due to …
a) resistance of blood vessels.
b) the elasticity of the vessels.
c) increasing the viscosity of the blood.
d) negative pressure in the pleural cavity.
e) osmotic blood pressure.
29. Rheogram allows you to evaluate ...
a) blood filling and vascular tone.
b) blood filling and systolic pressure.
c) blood filling and diastolic pressure.
d) blood filling and pulse pressure.
e) blood filling and medium pressure.
30. The lowest blood pressure is in ...
a) veins.
b) venules.
c) arterioles.
d) capillaries.
e) arteries.
31. High blood pressure is present in the capillaries of the ...
a) kidneys.
b) brain.
c) lungs.
d) liver.
e) skin.
32. Functions of veins are ...
a) transport, capacitive.
b) trophic, excretory.
c) respiratory, metabolic.
d) excretory, transport.
e) depositing, respiratory.
33. Arterioles are characterized by:

a) are resistive vessels, a change in their resistance changes the level of blood pressure in the veins, does not affect the value of the local blood flow
b) do not refer to resistive vessels, changes in their resistance change the level of blood pressure in the arteries, regulate the value of local blood flow
c) are resistive vessels, a change in their resistance does not affect the level of blood pressure in the arteries, regulate the value of the local blood flow
d) do not belong to the resistive vessels, the change in their resistance changes the blood pressure level in the arteries, does not regulate the value of the local blood flow
e) are resistive vessels, a change in their resistance changes the level of blood pressure in the arteries, regulates the value of the local blood flow
34. The growth of children is accompanied by:
a) a decrease in the number of capillaries, an increase in their total area, which with age leads to a decrease in the total peripheral resistance of the vessels
b) an increase in the number of capillaries, a decrease in their total area, which with age leads to a decrease in the total peripheral resistance of blood vessels
c) an increase in the number of capillaries, an increase in their total area, which with age, leads to an increase in the total peripheral vascular resistance
d) an increase in the number of capillaries, an increase in their total area, which with age leads to a decrease in overall peripheral vascular resistance
e) a decrease in the number of capillaries, a decrease in their total area, which with age leads to a decrease in the total peripheral resistance of blood vessels
35. Linear velocity of blood flow is characterized by:
a) the maximum in the aorta, the minimum in the capillaries, is measured in cm / s
b) the same for all parts of the vascular system, measured in ml / sec
c) maximum in the aorta, minimal in the veins, measured in ml / sec
d) the same for all parts of the vascular system, measured in cm / sec
e) maximum in the capillaries, minimal in the aorta, measured in ml / sec
36. The role of carbohydrates in the body is ...
a) mainly energetic.
b) mostly plastic.
c) equally plastic and energy.
d) humoral.
e) regulatory.
37. Negative nitrogen balance is observed ...
a) in a significant decrease of the protein in food.
b) during pregnancy.
c) during the growth period.
d) in a significant increase in the protein in food.
e) during the convalescence
38. A positive nitrogen balance can happen ...
a) during the period of growth, during pregnancy, at the moment of the convalescence.
b) in old age, when temperature is increased, abundant food to intake.
c) during starvation, hypothermia, low temperature of the environment.
d) in intensive physical loads, in children, in old age.
e) during pregnancy, infectious diseases, starvation
39. Positive nitrogen balance in the human body is observed ...
a) during the growth period.

b) in old age.
c) during starvation.
d) in intensive physical loads.
e) with a significant intake of carbohydrates
40. The greatest increase in basal metabolism is caused by the hormone ...
a) thyroxine.
b) epinephrine.
c) norepinephrine.
d) somatotropin.
e) glucagon
41. When 1 g of water evaporates from the surface of the skin, a body loses warmth equal to ...
a) 0.56 Kcal
b) 56 Kcal
c) 5.6 Kcal
d) 0.056 Kcal
e) 0.68 Kcal
42. Caloric fat factor is equal to ...
a) 9.3 kcal (38.9 kJ)
b) 4.1 kcal (17.2 kJ)
c) 5.4 kcal (22.7 kJ)
d) 7.6 kcal (31.9 kJ)
e) 10.3 kcal (44 kJ)
43. To determine the energy consumption by the indirect calorimetry method, the following methods of studying gas exchange are used ...
a) the Krog spirometer, according to Douglas-Haldane.
b) using the Shaternikov respirator chamber.
c) Etuater and Benedict chambers.
d) using the cameras of Shaternikov and Likhachev.
e) with the use of electronic instruments, the camera of Etuotera-Benedict.
44. The following hormones strengthen the basic metabolism...
a) adrenaline, thyroxine.
b) aldosterone, cortisone.
c) calciotonin, glucagon.
d) thyroxine, vasopressin.
e) insulin, vasopressin.
45. Heat production in a body is strengthened by the hormone ...
a) thyroxine.
b) insulin.
c) glucagon.
d) mineralocorticoid.
e) parathyroid hormone.
46. Assimilation is…
a) a breakdown of complex substances
b) a synthesis of simple substances
c) a breakdown of acids
d) a breakdown of bases
e) a synthesis of complex substances

47. In pregnancy the following state is observed
a) a negative nitrogen balance
b) a positive nitrogen balance
c) absence of nitrogen balance disorders
d) multiphase changes in the nitrogen balance
e) two-phase changes in the nitrogen balance
48. In a young healthy woman of 25 years, 16 g of nitrogen per day is excreted with urine after she consumed 120 g food protein. What assumption about the state of the woman could be done?
a) Negative nitrogen balance, protein starvation
b) Positive nitrogen balance, pregnancy
c) Positive nitrogen balance, rehabilitation after severe illness
d) Positive nitrogen balance, active formation of cellular structures
e) Negative nitrogen balance, pregnancy
49. Energy expenditures of an organism in conditions of physiological rest, in a supine position, with an empty stomach, at a temperature of comfort make up an … exchange:
a) Worker
b) Specific-dynamic
c) Basal
d) Thermal
e) Energy
50. The main source of energy during the strenuous activity of the body is…
a) breakdown of fats
b) breakdown of proteins
c) protein synthesis
d) synthesis of enzymes
e) oxidation of carbohydrates
51. A positive nitrogen balance is observed in…
a) pregnancy
b) protein and fatty starvation
c) specific amino acids deficiency in food
d) absence of physical training
e) fat and carbohydrate starvation
52. In an experimental animal, the sympathetic nervous system was irritated. What changes in metabolism could this lead to?
a) increasing the carbohydrate consumption
b) increasing the fat breakdown
c) formation of a micelle
d) protein deposition
e) fat deposition
53. A person consumed 100 grams of protein per day. At the same time he had a nitrogen balance. Then he switched to a ration with a daily protein content of 500 g. If in the third week of such a diet, to determine his nitrogen balance, how to change the release of nitrogen:
a) increased 5-fold; nitrogen balance
b) increased, but still not corresponding to consumption; positive nitrogen balance;
c) has not changed; positive nitrogen balance
d) decreased, the positive nitrogen balance
e) increased 5-fold; negative nitrogen balance.

54. To determine the basic metabolism, from the listed below indicators, one should be measured:
a) caloricity of food consumed
b) absorption of O2
c) digestibility of consumed food
d) physiological heat of combustion of proteins, fats and carbohydrates
e) physical activity
55. The center of thermoregulation is located in ...
a) the hypothalamus.
b) the medulla oblongata.
c) the midbrain.
d) the pons.
e) thalamus
56. Heat production is increased by the hormone ....
a) thyroxine
b) insulin
c) glucagon
d) mineralocorticoid
e) parathyroid hormone
57. When 1 g of water evaporates from the skin surface, the body loses ....heat.
a) 0.56 Kcal
b) 56 Kcal
c) 5.6 Kcal
d) 0.056 Kcal
e) 0.68 Kcal
58. Caloric fat factor is equal to....
a) 9.3 kcal (38.9 kJ)
b) 4.1 kcal (17.2 kJ)
c) 5.4 kcal (22.7 kJ)
d) 7.6 kcal (31.9 kJ)
e) 10.3 kcal (44 kJ)
59. With an increasing the temperature of the environment, in homoiothermal animals, heat production…, heat loss… .
a) decreases; increases
b) increases; decreases
c) decreases; decreases
d) increases; increases
e) increases; stays at a constant level
60. The main centers of thermoregulation are located in ....
a) the hypothalamus
b) the thalamus
c) the cerebellum
d) subcortical ganglia
e) spinal cord
61. Chemical thermoregulation includes the following processes ....
a) changes in the intensity of metabolism
b) heat conductivity
c) heat radiation

d) convection
e) evaporation
62. The main role in heat production is played by ....
a) muscles, liver, gastrointestinal tract
b) muscles, liver, skin
c) liver, heart, lungs
d) liver, gastrointestinal tract, lungs
e) muscles, connective tissue, fatty tissue
63. Isothermia is a… .
a) fever
b) inconstant body temperature
c) constant body temperature
d) metabolic changes
e) decrease of body temperature
64. Hyperthermia is a… .
a) increasing body temperature
b) inconstant body temperature
c) constant body temperature
d) metabolic changes
e) decrease in body temperature
65. Heat production and heat loss in homoiothermal animals with increasing temperature of environment (heat production and heat transfer accordingly)
a) increases; decreases
b) decreases; decreases
c) decreases; increases
d) increases; increases
e) does not change; does not change
66. Heat balance is:
a) a heat production during metabolism
b) dissipating heat to the surrounding space
c) violation of the thermoregulation mechanism
d) stationary state of heat exchange with the external environment without changing the heat content in the body
e) exchange of thermal energy of the organism with the environment
67. In artificial (medical) hypothermia, body temperature is reduced to 30 ° C. In this state of the body:
a) oxygen consumption increases to compensate the cooling
b) oxygen consumption decreases and tissue resistance to oxygen deficiency increases
c) the excitability of the nervous and muscular tissues increases
d) the heart rate increases
e) sympathetic nervous system increases its tone
68. Contractile thermogenesis is associated largerly:
a) with the change in tone and physical contractions of skeletal muscles
b) with a change in the activity of the smooth muscles of the gastrointestinal tract
c) with cutaneous blood circulation
d) with the work of the respiratory muscles
e) with the work of internal organs

69. What process provides the greatest output of heat production?
a) non-contractile thermogenesis
b) contractile thermogenesis
c) chemical thermoregulation
d) vasodilation of vessels
e) muscle relaxation
70. What structures of the hypothalamus regulate the magnitude of heat production?
a) front
b) medium
c) rear
d) rear and front
e) medium and front
71. A group of tourists is going to have to cross a significant distance of the Betpak-Dala desert on foot in mid-July. Air temperature is 38 ° C, windless.
How will the thermal homeostasis be maintained in such conditions?
a) by increased liver metabolic processes
b) by evaporation of sweat from the surface of the body
c) by narrowing of the skin vessels
d) by thermal radiation
e) by convection
72. The … possess(es) maximal visual acuity.
a) yellow spot
b) blind spot
c) the periphery of the retina
d) cornea
e) the optic nerve
73. To determine visual acuity, … is (are) used.
a) Sivtsev-Golovin tables
b) Forster's perimeter
c) Anfimov's tables
d) ophthalmoscope
e) Rabkin's tables
74. A blind spot is a place of the most densely locations of…
a) axons of ganglion cells forming the optic nerve.
b) cone cells.
c) rod cells.
d) pigment cells.
e) bipolar cells.
75. To correct the refraction of the eye in astigmatism, the folowing glasses are needed ...
a) cylindrical.
b) biconcave.
c) biconvex.
d) horizontal.
e) square.
76. To determine the fields of view, the folowing instrument is used ...
a) perimeter.
b) audiometer.

c) an esthetician.
d) Weber's compasses.
e) an ophthalmoscope.
77. Visual acuity is the ability of the eye to see ...
a) two neighboring points separately.
b) at close range.
c) at a distant distance.
d) with a fixed gaze.
e) in the dark.
78. The sensitivity of photoreceptors in the dark ...
a) increases
b) does not change.
c) disappears.
d) decreases.
e) changes by phases.
79. The central part of the analyzer is represented by the...
a) cortical centers.
b) thalamic nuclei.
c) middle brain.
d) cerebellum.
e) limbic structures.
80. The sensitivity of photoreceptors in bright light ...
a) decreases.
b) doen not change.
c) disappears.
d) increases.
e) changes by phases.
81. Under the impact of light in the retina, photochemical processes occur resulting in Rhodopsin of rod cells are broken down to...
a) retinal and opsin.
b) iodopsin and retinal.
c) erythrolab and vitamin A.
d) chlorolab and opsin.
e) vitamin A and iodopsin.
82. To correct refraction in myopia, the following glasses are needed…
a) biconcave
b) biconvex
c) horizontally concave
d) cylindrical
e) vertically concave
83. Painful skin irritations are perceived by…
a) Golgi tendon organ.
b) end-bulbs of Krause.
c) Meissner's corpuscles.
d) taste buds.
e) free axons.
84. The least tactile sensitivity is possessed by…

a) the finger pads
b) the tip of the nose
c) the tip of the tongue
d) the back surface of the hand skin, the skin of the leg and the back
e) the lips

85. To identify the various signals acting on the sensory organ, information is coded. What characteristics of signals are used for coding?
a) Frequency and number of receptor potentials
b) Amplitude of the receptor potential
c) Duration of action potentials
d) Amplitude and duration of the generator potential
e) Amplitude and duration of the receptor potential

86. Two persons suffer from farsightedness and wear glasses. What question (the same) you need to ask them to make sure that the reason for their farsightedness is the same for them?
a) What kind of lens do you use for vision correction?
b) Which items you see more clearly: located near, or at a long distance from the eyes?
c) At what age did you begin to wear glasses?
d) Is there a hereditary predisposition to farsightedness?
e) Has there been an eye injury in the childhood?

87. Which site on the retina is the place of the best vision and why?
a) Yellow spot, since there is a convergence of information during the transmission of signals in the retina
b) Blind spot, since there the largest aggregation of photoreceptors
c) The peripheral part of the retina, since there are mainly rods localized
d) Yellow spot, since there is no convergence of information during the transmission of signals in the retina
e) The central part of the retina, since there are rods located mainly

88. If the hand is kept in water at a temperature of 27 ° C, then at the first moment, when it transfers to the water 25 ° C, it seems cold. How is called is observed phenomenon?
a) Accommodation
b) Temperature contrast
c) True estimate of absolute temperature
d) Hypersensitivity
e) Refraction

89. In the patient, a lack of perception of red color was identified. What kind of disorder is it?
a) protanopia
b) deuteranopia
c) tritanopia
d) achromatization
e) night blindness

90. The studied person raises a cargo weighing 3 kg. What is the minimum weight gain is required, so that the person can feel it change?
a) 10 g
b) 30 grams
c) 50 grams
d) 100 g
e) 300 g

91. In a patient, violations of the distance estimation and a clear vision of the landscape were found. What the disorder could explain this?
a) binocular vision
b) light adaptation
c) eye accommodation
d) visual acuity
e) spherical aberration
92. Thermal skin receptors are characterized by:
a) mechanical irritation
b) a high rate of excitation and a superficial location
c) the highest density on the back
d) low speed of excitation and deeper locations in the skin
e) no ability to adapt
93. If the visual pathways are cut till the cross of the optic nerve from the left side, then…
a) the medial field of vision of the right eye and the lateral field
of the left eye disapear
b) the medial field of vision of the left eye and the lateral field
of the right eye disapear
c) there could be complete blindness to the left eye
d) there could be complete blindness to the right eye
e) there could be complete blindness to both eyes
94. In the experiment, it was established that a person holding a 100 g load on his palm feels a gain in weight only if the weight of the load is increased by 3 grams or more. If the mass of the initial cargo is 300 g, then a noticeable increase in the load will be
a) 3 g
b) 6 g
c) 9 g
d) 15 g
e) 30g
95. The patient has a loss of pain and temperature sensitivity on the right side of the trunk and paralysis on the left. The lesion is present in the following section of the cutaneous analyzer…
a) peripheral
b) cortical
c) left neural pathways
d) right neural pathways
e) peripheral and cortical
96. To assess the degree of functional damage to the occipital lobe of the cerebral cortex, the folowing method should be applied:
a) audiometry
b) perimetry
c) evaluation of speech functions
d) EEG
e) psychological tests
97. The upper channel of the cochlea is filled with..
a) perilymph
b) endolymph
c) saline solution

d) lymphoma
e) intracellular fluid
98. The vestibular duct receptors are located in the cochlea of ...
a) semicircular ducts
b) muscle spindles
c) medulla oblongata
d) the cerebellum
e) cochlea
99. In the wall separating the middle ear from the inside one is located...
a) an oval window, a round window
b) an oval window, main membrane
c) a round window, main membrane
d) an oval window, tectorial membrane
e) a round window, tectorial membrane
100. The middle channel of the cochlea is filled with...
a) endolymph
b) perilymph
c) saline solution
d) lymph
e) intracellular fluid
101. The peripheral part of the vestibular analyzer consists of ...
a) vestibule, semicircular ducts
b) the vestibule, the cochlea
c) cochlea, semicircular ducts
d) vestibule, otoliths
e) semicircular canals, otoliths
102. To correct refraction in myopia, the folowing glasses are needed ...
a) biconcave
b) cylindrical
c) biconvex
d) vertically concave
e) horizontally concave
103. The eye accommodation is ...
a) the ability to see clearly objects at any distance.
b) lack of a clear image of the point on the retina.
c) a different degree of refraction of the central and peripheral rays by the lens.
d) change in the sensitivity of retinal elements under the influence of light.
e) the ability to see in the dark.
104. Visual acuity is the ability of the eye to see ...
a) two neighboring points separately
b) at close range
c) at a distant distance
d) with a fixed look
e) in the dark
105. To determine the fields of view, the folowing instrument is used ...
a) perimeter
b) audiometer

c) an esthetician
d) Weber's compasses
e) ophthalmoscope
106. To investigate the temperature sensitivity, the folowing intrument is used ...
a) thermoesthesiometer
b) Weber's compass
c) perimeter
d) audiometer
e) olfactometer
107. The multimodal sensation is ...
a) light
b) sound
c) taste
d) odor
e) pain
108. What is the important cytochemical center of the olfactory cell?
a) Olfactory Mace
b) Olfactory cilia
c) Olfactory bulb
d) Olfactory tract
e) Front olfactory nucleus
109. If during strong stress to check the taste sensations of a person, would they be weakened or strengthened in comparison with a calm state?
a) Increased salivation due to excitation of the sympathetic nervous system
b) Increased salivation by excitation of the parasympathetic nervous system
c) Weakened by a decrease in salivation due to excitation of the sympathetic nervous system
d) Weakened by a decrease in salivation due to excitation of the parasympathetic nervous system
e) Weakened by increased salivation due to excitation of the sympathetic nervous system
110. If airborne sound conduction is disordered, but bone sound conduction is not, then the lesion may be localized in the:
a) middle ear
b) cochlea
c) vestibule
d) auditory nerves
e) cortex of the temporal lobe
111. The otolith organ does not provide information on:
a) the position of the head in space
b) changes of head position in space
c) steady straight motion
d) unsteady motion of the body (linear acceleration)
e) movement of the body in the vertical plane
112. The upper channel of the cochlea is filled with..
a) perilymph
b) endolymph
c) saline solution
d) lymphoma
e) intracellular fluid

113. The vestibular duct receptors are located in the cochlea of ...
a) semicircular ducts
b) muscle spindles
c) medulla oblongata
d) the cerebellum
e) cochlea
114. In the wall separating the middle ear from the inside one is located...
a) an oval window, a round window
b) an oval window, main membrane
c) a round window, main membrane
d) an oval window, tectorial membrane
e) a round window, tectorial membrane
115. The middle channel of the cochlea is filled with...
a) endolymph
b) perilymph
c) saline solution
d) lymph
e) intracellular fluid
116. The peripheral part of the vestibular analyzer consists of ...
a) vestibule, semicircular ducts
b) the vestibule, the cochlea
c) cochlea, semicircular ducts
d) vestibule, otoliths
e) semicircular canals, otoliths
117. To correct refraction in myopia, the folowing glasses are needed ...
a) biconcave
b) cylindrical
c) biconvex
d) vertically concave
e) horizontally concave

Methodical Recommendation No. 14

1. Theme: Functional asymmetry of the cerebral cortex.
2. Learning goals: to study the functional asymmetry of the cerebral cortex.
3. Tasks
1. To prepare literature on the topic.
2. To study and analyze theoretical material.
3. To prepare presentation on the topic of the lesson.
4. To briefly and easily present the material of the presentation.
5. To be ready to answer questions on the presentation.
4. Way of Performing
1. Compilation and defense of the presentation.
5. Criteria of performance and assessment: see appendix No. 1
6. Terms of performance: on the 15th week
7. Bibliography: see appendix No. 2
8. Assessment procedures
Questions

1. What is the functional asymmetry of the brain?
2. What is brain asymmetry?
3. Which hemisphere is responsible for speech?
4. Which hemisphere is responsible for the imagination?
5. What is memory?
6. What do you know about theories on mechanisms and phases of sleep?
7. What is the physiological significance of night dreams?

Appendix No. 1

Preparation and Performance of an Essay

Form of Control	Evaluation	Criteria for Evaluation
Preparation and protection of the abstract	Excellent Corresponds to points: 95-100; 90-94	A student prepares an essay on a topic by an appointed time, independently, accurately, with volume of at least 10 pages of an A4 format with a single line spacing and a font

		size of 14, using at least 5 sources and presence of a detailed plan, cited schemes, tables and figures, corresponding to the topic; during defense of an essay, a student does not read the text, but answers confidently without mistakes; all the questions are answered.
	Good Corresponds to points: 85-89; 80-84; 75-79	A student prepares an essay on a topic by an appointed time, independently, accurately, with volume of at least 10 pages of an A4 format with a single line spacing and a font size of 14, using at least 5 sources and presence of a detailed plan, cited schemes, tables and figures, corresponding to the topic; during defense of an essay, a student does not read the text, but answers confidently without mistakes; during answering questions a student makes unprincipled mistakes.
	Satisfactorily Corresponds to points: 70-74; 65-69; 60-64; 50-54	A student prepared an essay on the topic by an appointed time, independently, but inaccurately, with a volume of at least 10 pages of an A4 format with a single line spacing and a font size of 14, using less than 5 sources and having an undeveloped plan; during a defense of an essay, a student reads the text, answers uncertainly, makes fundamental mistakes.
	Unsatisfactory Corresponds to points 25-49 0-24	A student does not prepare an essay on the topic by an appointed time, or prepares it by an appointed time, but non-independently, not accurately, with a volume of less than 10 pages of an A4 format with a different line spacing and font size, without mentioning sources; a plan is absent; during a defense of an essay, a student reads the text, answers uncertainly, makes fundamental mistakes; during answering, a student makes gross mistakes or cannot answer questions and does not defend an essay.

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